NEURO-521 Spring 2016 Gilmore

This is the repository for Rick Gilmore's section of NEURO-521 Spring 2016. The repo can be found here.

Please find below information about the required and supplemental readings along with some questions that will guide our discussions. PDFs of all readings are on the course ANGEL site.

I have indicated in **boldface** the reading that should be the focus of your review paper.

2015-01-12 -- Brain architectures for adaptive behavior

Questions

1. What behaviors are essential for animals to perform?
2. How is the nervous system organized to contribute to these behaviors?
3. Should molecular neurobiologists think about ethology? Should cognitive neuroscientists think about molecular neurobiology? Why or why not?

Readings

Swanson, L. W. (2007). Quest for the basic plan of nervous system circuitry. Brain Research Reviews, 55(2), 356–372. http://doi.org/10.1016/j.brainresrev.2006.12.006

Tinbergen, N. (1963). On aims and methods of ethology. Zeitschrift Für Tierpsychologie, 20, 410–433.

Supplemental

Swanson, L. W. (n.d.) Brain Architecture. Retrieved 2015-12-25 from http://larrywswanson.com/?page_id=1523

Tinbergen's four questions (n.d.). Retrieved 2015-12-25 from https://en.wikipedia.org/wiki/Tinbergen%27s_four_questions

2015-01-14 -- Divide and conquer: Functional segregation in sensory processing

Questions

1. How can functional properties of neurons in the cerebral cortex be studied?
2. What are the properties of sensory-related neurons in the cerebral cortex?
3. Are there similarities across sensory systems?

Readings

Hubel, D. H., & Wiesel, T. N. (1959). Receptive fields of single neurones in the cat's striate cortex. The Journal of Physiology, 148(3), 574–591. http://doi.org/10.1113/jphysiol.1959.sp006308

Mountcastle, V. B., Davies, P. W., & Berman, A. L. (1957). Response properties of neurons of cat's somatic sensory cortex to peripheral stimuli. Journal of Neurophysiology, 20, 374–407.

2015-01-19 -- Maps in the cortex

Questions

1. What is the evidence for a topographic organization in sensory and motor processing?
2. Are maps fundamental to sensory processing or merely a byproduct of other factors?

Readings

Kaas, J. H. (1997). Topographic Maps are Fundamental to Sensory Processing. Brain Research Bulletin, 44(2), 107–112. http://doi.org/10.1016/S0361-9230(97)00094-4

Weinberg, R. J. (1997). Are Topographic Maps Fundamental to Sensory Processing? Brain Research Bulletin, 44(2), 113–116. http://doi.org/10.1016/S0361-9230(97)00095-6

Supplemental

Penfield, W., & Boldrey, E. (1937). Somatic Motor and Sensory Representation in the Cerebral Cortex of Man as Studied by Electrical Stimulation. Brain, 60(4), 389–443. http://doi.org/10.1093/brain/60.4.389

2015-01-21 -- Studying human brain function through fMRI

Questions

1. How does fMRI work? What does it measure?
2. How do "functional" maps of the cerebral cortex derived from fMRI relate to maps derived from other methods?

3. How are fMRI-based maps actually created?

Readings

DeYoe, E. A., Bandettini, P., Neitz, J., Miller, D., & Winans, P. (1994). Functional magnetic resonance imaging (FMRI) of the human brain. Journal of Neuroscience Methods, 54(2), 171–187. http://doi.org/10.1016/0165-0270(94)90191-0

Rosen, B. R., Buckner, R. L., & Dale, A. M. (1998). Event-related functional MRI: Past, present, andfuture. Proceedings of the National Academy of Sciences of the United States of America, 95(3), 773–780. http://www.pnas.org/content/95/3/773.full#content-block

Supplemental

Warnking, J., Dojat, M., Guérin-Dugué, A., Delon-Martin, C., Olympieff, S., Richard, N., … Segebarth, C. (2002). fMRI Retinotopic Mapping—Step by Step. NeuroImage, 17(4), 1665–1683. http://doi.org/10.1006/nimg.2002.1304